

Treatment Has Potential To Reduce Allergenicity of Peanuts

A phytochemical compound—tannic acid—may be an effective scavenger of peanut allergens, according to a study by Agricultural Research Service food technologist Si-Yin Chung and support scientist Shawndrika Reed. They are in the Food Processing and Sensory Quality Research Unit, which is part of the Southern Regional Research Center in New Orleans, Louisiana.

In people who are allergic to peanuts, the immune system reacts to amino acid sequences, or proteins, in the peanuts. The study provides insights into whether tannic acid can be used during food processing to reduce the allergenicity of peanut-based foods and beverages.

“We also wanted to see if this compound can help reduce or prevent allergic responses that are induced when people accidentally ingest peanut residues contained in food products,” says Chung.

Tannic acid, or tannin, is a phenolic antioxidant commonly found in legumes, coffee, tea, and certain tree barks. It has been shown to bind to allergenic protein fragments, forming insoluble complexes that may keep the allergenic protein from being released in the stomach and gut.

Chung wanted to see whether mixing tannic acid with major peanut allergen proteins (Ara h 1 and Ara h 2) would form stable complexes (pellets) that could prevent release of the peanut allergens in the human stomach and gut. If so, an allergic reaction could be reduced or possibly prevented. Allergic reaction occurs when an antibody called “immunoglobulin E” binds to the allergenic

protein fragments, leading to the release of histamines.

For the study, Chung mixed four different levels of tannic acid in peanut butter extract. The pellets that were formed and collected were each tested in a solution at the acidic level of the human stomach (pH 2) and then in another solution at the alkaline level of the intestines (pH 8). The solutions were then analyzed for allergens that might be released from the pellets under those pH conditions.

The tannic acid levels were 0.25, 0.5, 1, and 2 milligrams (mg) per milliliter of

peanut butter extract. Results showed that the pellets formed at tannic acid concentrations greater than 0.5 mg per milliliter of peanut butter extract did not release major peanut allergens at either pH level. The authors concluded that these bound allergens should pass through the gastrointestinal system without being absorbed, and therefore they would not cause an allergic reaction.

“The precise level of tannic acid that is needed to prevent allergic reaction, without altering food flavor or reducing protein levels in the food, still needs to be worked out,” says Chung.

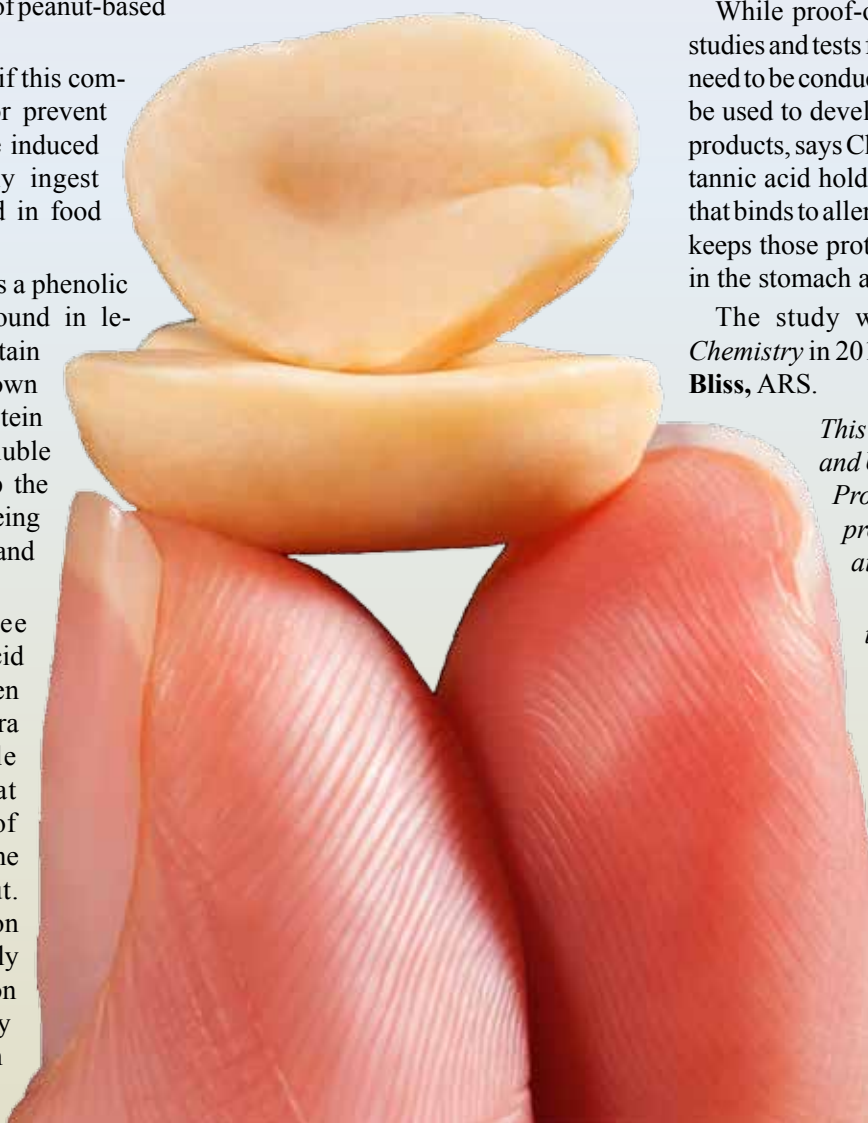
While proof-of-concept animal-model studies and tests for safety and efficacy still need to be conducted before tannic acid can be used to develop less allergenic peanut products, says Chung, the study shows that tannic acid holds promise as a scavenger that binds to allergenic peanut proteins and keeps those proteins from being released in the stomach and gut after ingestion.

The study was published in *Food Chemistry* in 2012.—By **Rosalie Marion Bliss**, ARS.

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*Si-Yin Chung is in the USDA-ARS Food Processing and Sensory Quality Research Unit, Southern Regional Research Center, New Orleans, LA 70124; (504) 286-4465, siyin.chung@ars.usda.gov.**

ARS scientists found that tannic acid can bind to allergenic peanut proteins, potentially reducing the chances of an allergic reaction.



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